UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,719	06/17/2002	Dong Young Kim	Lee&KoUSNP	9724

7590 08/08/2003

Santangelo Law Offices
Third Floor
125 South Howes
Fort Collins, CO 80521

EXAMINER
BARBER, THERESE

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/049,719	KIM ET AL.	
	Examiner	Art Unit	
	Therese Barber	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *26-43,48,53 and 54* is/are allowed.

6)☒ Claim(s) *1-11,15,16,18,19,22-25,44-47 and 49-52* is/are rejected.

7)☒ Claim(s) *12-14,17,20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

On page 5 of the specification, the applicants listed a US patent (USPN 5,327,516) but did not include the US patent on the information disclosure statement or provide a copy of the US patent.

Claim Objections

2. Claims 2, 6, 18, 24, 27, 28, 35, 36, 40, 44 and 49 are objected to because of the following informalities:

Regarding claim 2, line 3, the term "corrected" should be changed to the term "connected".

Regarding claim 6, line 4, the limitation of "there between" is vague. This limitation could be interpreted as having a value of 20 ps/nm-km or having a value of 1 ps/nm-km, both of which are numeral values, wherein 10 ps/nm-km falls between.

Regarding claims 7, 24, 35, 36, 40, and 49, line 1, the term "claims" should be changed to the term "claim".

Regarding claim 18, line 2, the term "f iber" should be changed to "fiber".

Regarding claim 27, line 3, the term "ar6" should be changed to the term "are".

Regarding claim 28, line 1, the numeral "2 6" should be changed to the numeral "26".

Regarding claim 44, line 2, the numeral "1O" should be changed to the numeral "10".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7, 44-45, 46, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (USPN 6,532,330) and Chraplyvy et al. (USPN 5,559,920).

5. Regarding claims 1-7 and 44-45, Mollenauer discloses an optical fiber for a wavelength division multiplexing (WDM) system (col. 1, lines 23-26) that includes a plurality of connected optical fibers, wherein each connected optical fibers is formed of a plurality of optical fibers (col. 6, lines 13-20) exhibiting different dispersion values (col. 5, lines 34-41and col. 7, lines 17-22), different dispersion slopes (col. 5, lines 55-57; col. 11, lines 44-58), different lengths (col. 6, lines 21-51) in a predetermined operating wavelength range (col. 7, lines 7-8 and 15-16) being connected to one another in an optical order (figs. 4 and 15); wherein the different dispersion

values and different lengths of the optical fibers are controlled to have an average dispersion value corresponding to a value required in the WDM system (col. 7, lines 17-22); wherein the different dispersion values (col. 7, lines 17-22; col. 11, lines 41-44), different slopes (figs. 5, 6 and 15), and different lengths (col. 6, lines 21-51 and col. 7, lines 41-47) of the optical fibers are controlled to have an average dispersion slope corresponding to a value required in the WDM system (col. 11, line 59 to col. 12, 41; fig. 15); wherein a part of the different dispersion values are +2 ps/nm-km or more and another part of the different dispersion values are –2 ps/nm-km or less (col. 7, lines 19-22; col. 9, lines 16-42); wherein the connected fibers are connected to another (figs 4 and 15) in order for adjacent optical fibers to have dispersion values of the opposite signs (col. 7, lines 19-22; col. 9, lines 27 and 42), while exhibiting a dispersion value difference of at least 10 ps/nm-km (col. 7, lines 24-29); wherein each of the connected optical fibers has a length of 0.5 to 20 km (col. 7, lines 31-37 and 41-47); wherein the connected optical fiber has an average dispersion value ranging from 1 ps/nm-km to 10 ps/nm-km (col. 12, line 52 to col. 13, line 66); and wherein the operating wavelength range is selected from a group from 1,300 nm to 1650 nm (col. 2, lines 34-35).

Mollenauer fails to discloses the different effective core areas of the different optical fibers of the dispersion compensating fiber.

Chraplyvy discloses a dispersion compensating fiber (DCF) that is utilized in WDM system (col.2, lines 3-18), wherein the effective core areas of the DCF and the transmission fibers have different values (col. 3, lines 66-67). Chraplyvy discloses that the threshold value of power is inversely proportional to the effective core area (col. 3, lines 62-65) and that the negative DCF has a reduced core size resulting in non-linear distortion (col. 4, lines 14-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made that an optical fiber for a WDM system including a plurality of optical fibers exhibiting different dispersion values, different dispersion slopes and different lengths as disclosed by Mollenauer could be modified to include the different effective core areas of the dispersion compensating fiber as disclosed by Chraplyvy. Accordingly, the resultant structure will have different core sizes, different dispersion slope, different dispersion values, and different lengths, resulting in non-linear distortion that is utilized in transmitting optical signals in a WDM optical transmission system.

6. Regarding claims 46, 49, and 50, Mollenauer discloses an optical fiber for a WDM system (col. 1, lines 23-26) that includes a plurality of connected optical fibers, wherein each connected optical fibers is formed of a plurality of optical fibers (col. 6, lines 13-20) exhibiting different dispersion values (col. 5, lines 34-41and col. 7, lines 17-22), different dispersion slopes (col. 5, lines 55-57; col. 11, lines 44-58), different lengths (col. 6, lines 21-51) in a predetermined operating wavelength range (col. 7, lines 7-8 and 15-16) being connected to one another in an optical order (figs. 4 and 15); and connecting means for interconnecting the optical fibers (fig. 15).

Mollenauer fails to discloses the different effective core areas of the first and second optical fibers of the dispersion compensating fiber and the different components that are utilized in a WDM optical transmission system.

Chraplyvy discloses a DCF that is utilized in WDM system (col.2, lines 3-18), wherein the effective core areas of the DCF and the transmission fibers have different values (col. 3, lines

66-67). Chraplyvy discloses that the threshold value of power is inversely proportional to the effective core area (col. 3, lines 62-65) and that the negative DCF has a reduced core size resulting in non-linear distortion (col. 4, lines 14-22). Chraplyvy discloses a WDM system comprised of a transmitting terminal (23), intermediate fiber dispersion spans (25-29); multiplexer (21) connected to the transmitting terminal; optical amplifiers (AMP in fig. 2); a demultiplexer (22); and a receiving terminal (33) connected to the demultiplexer and adapted to receive the demultiplexed optical signal (24) (col. 5, lines 8-17; fig. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made that an optical fiber for a WDM system including a plurality of optical fibers exhibiting different dispersion values, different dispersion slopes and different lengths as disclosed by Mollenauer could be modified to include the different effective core areas of the dispersion compensating fiber as disclosed by Chraplyvy, whereby, the resultant structure will replace the intermediate fiber dispersion spans in the WDM optical transmission system as disclosed by Chraplyvy. Accordingly, the resultant structure will have different core sizes, different dispersion slope, different dispersion values, and different lengths, resulting in non-linear distortion that is utilized in transmitting optical signals in a WDM optical transmission system.

7. Claims 8-11, 15-16, 18-19, 22-25, 47, 51, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer and Chraplyvy et al.

8. Regarding claims 8-11, 15-16, 18-19, and 22-25, Mollenauer discloses an optical fiber for a WDM system (col. 1, lines 23-26) that includes a plurality of connected optical fibers, wherein

each connected optical fibers is formed of a plurality of optical fibers (col. 6, lines 13-20) exhibiting first and second different dispersion values (col. 5, lines 34-41and col. 7, lines 17-22), different first and second dispersion slopes (col. 5, lines 55-57; col. 11, lines 44-58), different first and second lengths (col. 6, lines 21-51) in a predetermined operating wavelength range (col. 7, lines 7-8 and 15-16) being connected to one another in an optical order (figs. 4 and 15); wherein the different first and second dispersion values and the different first and second lengths of the optical fibers are controlled to have an average dispersion value corresponding to a value required in the WDM system (col. 7, lines 17-22); wherein the different first and second dispersion values (col. 7, lines 17-22; col. 11, lines 41-44), the different first and second slopes (figs. 5, 6 and 15), and the different first and second lengths (col. 6, lines 21-51 and col. 7, lines 41-47) of the optical fibers are controlled to have a dispersion value corresponding to a value required in the WDM system (col. 11, line 59 to col. 12, 41; fig. 15); wherein the first and second dispersion values have opposite signs (col. 7, lines 19-22), while exhibiting a dispersion value difference of at least 10 ps/nm-km (col. 7, lines 19-29; col. 9, lines 16-42); wherein the first dispersion slope has a positive value and the second dispersion slope has a negative value (col. 9, lines 16-42); wherein the first dispersion value of the first optical fiber is in a positive ps/nm-km range and wherein the second dispersion value of the second optical fiber is in a negative range at a central wavelength in an operating wavelength range (col. 7, lines 19-37); wherein the first and second lengths of the first and second optical fiber has a range from 3 km to 6 km (col. 7, lines 31-37 and 41-47); wherein the first and second fibers exhibit a dispersion value of 0 in an operating range of 1,300 to 1,550 nm (col. 2, lines 35-46; col. 9, lines 43-55); and wherein the first optical fiber exhibits a dispersion value of 0 in the operating range of 1,300 to 1,500 nm

(col. 2, lines 35-46; col. 9, lines 43-55), and the second optical fiber exhibits a dispersion value of 0 in the operating range of 1,600 nm or more (col. 10, line 65 to col. 11, line 7).

Mollenauer fails to discloses the different effective core areas of the different optical fibers of the dispersion compensating fiber.

Chraplyvy discloses a DCF that is utilized in WDM system (col.2, lines 3-18), wherein the effective core areas of the DCF and the transmission fibers have different values (col. 3, lines 66-67). Chraplyvy discloses that the threshold value of power is inversely proportional to the effective core area (col. 3, lines 62-65) and that the negative DCF has a reduced core size resulting in non-linear distortion (col. 4, lines 14-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made that an optical fiber for a WDM system including a plurality of optical fibers exhibiting different dispersion values, different dispersion slopes and different lengths as disclosed by Mollenauer could be modified to include the different effective core areas of the dispersion compensating fiber as disclosed by Chraplyvy. Accordingly, the resultant structure will have different core sizes, different dispersion slope, different dispersion values, and different lengths, resulting in non-linear distortion that is utilized in transmitting optical signals in a WDM optical transmission system.

9. Regarding claims 47, 51 and 52, Mollenauer discloses an optical fiber for a WDM system (col. 1, lines 23-26) that includes a plurality of connected optical fibers, wherein each connected optical fibers is formed of a plurality of optical fibers (col. 6, lines 13-20) exhibiting first and second different dispersion values (col. 5, lines 34-41and col. 7, lines 17-22), different first and

second dispersion slopes (col. 5, lines 55-57; col. 11, lines 44-58), different first and second lengths (col. 6, lines 21-51) in a predetermined operating wavelength range (col. 7, lines 7-8 and 15-16) being connected to one another in an optical order (figs. 4 and 15) and connecting means for interconnecting the optical fibers (fig. 15).

Mollenauer fails to discloses the different effective core areas of the first and second optical fibers of the dispersion compensating fiber and the different components that are utilized in a WDM optical transmission system.

Chraplyvy discloses a DCF that is utilized in WDM system (col.2, lines 3-18), wherein the effective core areas of the DCF and the transmission fibers have different values (col. 3, lines 66-67). Chraplyvy discloses that the threshold value of power is inversely proportional to the effective core area (col. 3, lines 62-65) and that the negative DCF has a reduced core size resulting in non-linear distortion (col. 4, lines 14-22). Chraplyvy discloses a WDM system comprised of a transmitting terminal (23), intermediate fiber dispersion spans (25-29); multiplexer (21) connected to the transmitting terminal; optical amplifiers (AMP in fig. 2); a demultiplexer (22); and a receiving terminal (33) connected to the demultiplexer and adapted to receive the demultiplexed optical signal (24) (col. 5, lines 8-17; fig. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made that an optical fiber for a WDM system including a plurality of optical fibers exhibiting different dispersion values, different dispersion slopes and different lengths as disclosed by Mollenauer could be modified to include the different effective core areas of the dispersion compensating fiber as disclosed by Chraplyvy, whereby, the resultant structure will be able to replace the intermediate fiber dispersion spans in the WDM optical transmission system

as disclosed by Chraplyvy. Accordingly, the resultant structure will have different core sizes, different dispersion slope, different dispersion values, and different lengths, resulting in non-linear distortion that is utilized in transmitting optical signals in a WDM optical transmission system.

Allowable Subject Matter

10. Claims 12-14, 17, 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if overcoming 112 rejections and rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 12-14, the claims would be allowable over the prior art of record fails to teach or to reasonably suggest the specific logarithms that are being utilized to derive to obtain the average dispersion value, the dispersion slope value and the effective area of the plurality of connected fibers that are included in the optical fiber for a wavelength division multiplexing system, as set forth in the claimed combination.

Regarding claims 17, 20 and 21, the claims would be allowable over the prior art of record because the prior art fails to teach or to reasonably suggest an optical fiber for a wavelength division multiplexing system that includes the plurality of connected optical fibers, wherein each connected optical fibers is formed of a plurality of optical fibers wherein the first and second dispersion slopes have positive values of +0.1 ps/nm^2-km or less or wherein the second dispersion slope has a negative value of -0.1 ps/nm^2-km.

11. Claims 26-43, 48, 53 and 54 allowed.

14. Regarding claims 26-43, 48, 53 and 54, the claims are allowable over the prior art of record for at least the reason that although the prior art discloses an optical fiber for a wavelength division multiplexing system that includes the plurality of connected optical fibers exhibiting different dispersion values, different effective core areas, different dispersion slopes, and different lengths in an operating predetermined wavelength range, the prior art fails to teach or to reasonably suggest an optical fiber that can be utilized in a wavelength division multiplexing system that includes the plurality of connected optical fibers, wherein the first, second and third optical fibers exhibit different lengths; wherein the first and second optical fibers exhibit different dispersion slope values and different effective areas; and wherein the first and third optical fibers exhibit different lengths but the third optical fiber exhibits the same effective core area, dispersion value and dispersion slope value as the first optical fiber, as set forth in the claimed combination.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Therese Barber whose telephone number is (703) 306-0205. The examiner can normally be reached on Monday to Friday from 8:30 a.m. to 6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-4857 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

tb
July 28, 2003

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800